

Application No. 09/874,381
Reply to Office Action dated June 5, 2003

REMARKS

Claims 1-9, 27-32, 34, and 35 will be pending upon entry of the present amendment. Claims 1, 27, 31, and 32 are amended, claim 33 is cancelled, and new claims 34 and 35 are herein submitted. The Examiner has rejected claims 31-33 under 35 U.S.C. § 112, second paragraph as being indefinite. Claim 31 has been amended as follows:

31. (Currently Amended) An electronic device, comprising:

a body of semiconductor material having ~~a~~-first and ~~a~~-second faces parallel to each other, and a third face transverse to the first and second faces;

an electrical connection region formed on a periphery of said first face;

a covering structure, covering said first face and having a face ~~transverse-coplanar with~~ the first-third face;

an opening in said covering structure, the opening sized and positioned to expose a portion of the first face, including said electrical connection region, and configured to admit a lead extending from a direction transverse to the ~~transverse-third~~ third face ~~of the covering structure,~~ to contact the electrical connection region; and

a heat dissipation region, in direct contact with said second face.

With the amendment of claim 31, the relationship of the third face with respect to the first and second faces, as well as the face of the covering structure are clear and unambiguous. Additionally, the recitation of the "opening ... configured to admit a lead extending from a direction transverse to the third face" is equally unambiguous. According, claim 31 is allowable over 35 U.S.C. § 112.

Claims 32 has been amended to recite, in part, "a metallic lead affixed to the connection region and *intersecting* the plane of the third face."

With this amendment, claim 32 is clear and unambiguous with respect to the subject matter claimed, and is thus allowable over 35 U.S.C. § 112.

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The Examiner has rejected claims 1, 5, 8, 27, 28, 29, 31, 32, and 33 under 35 U.S.C. § 102(e) as being anticipated by Ohsawa et al., and has rejected claims 2-4, 6, 7, 9, and 30 under 35 U.S.C. § 103(a) as being unpatentable over Ohsawa et al. in view of Val et al.

Ohsawa et al. fails to teach an opening in a covering structure having "a size that is greater than a size of a portion of a selected lead...such that the portion of the selected lead is positionable within the opening." In contrast, Ohsawa et al. teaches that the leads are connected first to the semiconductor element, and then a liquid resin is used to seal gaps in and around the semiconductor element (column 6, lines 47-57). Clearly, such an operation will result in an opening that exactly conforms to the size of the lead, and so is not greater in size than the lead, as recited in claim 1.

Additionally, it would not be possible to place a lead within the opening, as recited by claim 1, were such an opening such as those of Ohsawa et al. to be formed prior to the insertion of the leads. Accordingly, Ohsawa et al. fails to anticipate claim 1, which is therefore allowable thereover. Claims 2-9 and 27-30 are allowable as dependent claims from claim 1.

Claim 28 is allowable on its own merits, apart from its dependence on allowable claim 1. Claim 28 recites, "wherein a surface area of the portion of the metallic lead in contact with the electrical connection region and affixed thereto is less than the surface area of the portion of the first face." Referring to Figure 1A of Ohsawa et al., it may be seen that the liquid resin 24 exactly conforms to the size and shape of the leads affixed to the LSI chip 4. Thus, the surface area of the portion of the LSI chip within an opening formed by the presence of the lead exactly conforms to the shape and surface area of that lead. Accordingly, Ohsawa et al. fails to teach the limitation of claim 28, which is therefore allowable over Ohsawa et al.

Ohsawa et al. fails to teach a covering structure having a face coplanar with the third face of the semiconductor material body as recited by claim 31. Nor would it be appropriate to combine Val et al. with Ohsawa et al. for the purpose of rejecting claim 31, inasmuch as Val et al. teaches formation of leads and resin coating on a semiconductor substrate prior to cutting the substrate into individual chips (column 3, lines 25-26, 40-45, and 65-67), while Ohsawa et al. teaches the attachment of leads and the coating of the protective layer 24 on a finished chip after the chip has been separated from the semiconductor substrate. Accordingly,

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a combination of Val et al. with Ohsawa et al. would render Ohsawa et al. inoperative for its intended purpose. Thus, such a combination would be inappropriate. Accordingly, claim 31 is allowable over the cited prior art.

Claim 32 recites, in part, "an opening in the covering structure positioned over the connection region and configured to provide access thereto, the opening being larger than an end of the metallic lead positioned therein." Ohsawa et al. fails to teach this limitation, inasmuch as the liquid resin of Ohsawa et al.'s device is applied to the LSI chip after the leads have been affixed thereto, and therefore exactly conforms to those leads. Thus, any opening in the resin is no larger than the metallic lead within the opening. Accordingly, claim 32 is allowable over Ohsawa et al.

New claims 34 and 35 are herein submitted to provide coverage to previously unclaimed subject matter. In particular, claim 34 recites, in part, "an opening in the covering structure, extending in portions of the upper and side faces thereof, the opening sized and positioned to expose the electrical connection region."

Neither Ohsawa et al. nor Val et al. teach this limitation, Ohsawa et al. teaches openings in a surface of the resin coating that lies at right angles to an upper surface of the chip, as may be seen with reference to Figure 1A of Ohsawa et al. For its part, Val et al. teaches an opening in the coating layer in a surface that lies parallel to an upper surface of the chip, as may be seen with reference to Figures 6, 9, and 10. In both cases, inasmuch as the coating layers are applied after the leads are attached, openings in the coating exactly conform to the position, size, and orientation of the respective leads. Thus, neither reference offers a teaching or motivation to form openings in a covering structure as recited in claim 34. For at least these reasons, claim 34 is allowable over the cited prior art. Dependent claim 35 is also allowable thereover.

With respect to the remaining rejections, these rejections are moot, inasmuch as they are directed to dependent claims, which claims depend from allowable independent claims.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

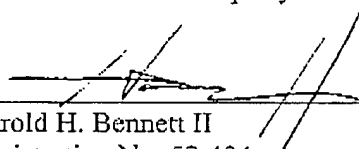
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The Commissioner is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

Respectfully submitted,

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Request for Continued Examination

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